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Federal Communications Commission
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Amendment of Section 2.106 of the) ET Docket No. 95-18
Commission's Rules to Allocate) RM-7927
Spectrum at 2 GHz for Use by the) PP-28
Mobile-Satellite Service)

**PETITION FOR PARTIAL RECONSIDERATION
OF THE
MSS COALITION**

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TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	iii
INTRODUCTION	2
I. THE COMMISSION MUST RECONSIDER THE AMOUNT OF SPECTRUM IT ACCORDED BAS LICENSEES BECAUSE THAT DECISION IS BOTH ARBITRARY AND CAPRICIOUS AND AN ABUSE OF DISCRETION.....	3
II. THE COMMISSION MUST RECONSIDER THE AMOUNT OF SPECTRUM IT ACCORDED BAS LICENSEES IN LIGHT OF RECENT REGULATORY AND TECHNOLOGICAL DEVELOPMENTS REGARDING DIGITAL TECHNOLOGY	9
A. The Commission's DTV Order Has Accelerated The Conversion Of Over-The-Air-Broadcast Television Operations From Analog To Digital	10
B. Digital Technology Is Currently Used In A Variety Of Applications	13
C. Existing Digital Technology Can Be Applied To ENG Use	15
III. THE COMMISSION SHOULD NOT ACCORD BAS SUPPLEMENTAL SPECTRUM AT 2110-2130 MHZ BECAUSE BAS OPERATIONS CAN -- AND SHOULD -- BE FULLY ACCOMMODATED IN THE 2025-2110 MHZ BAND	18
A. Conversion Of BAS Operations To Digital Promotes Spectrum Efficiency	19
B. Conversion Of BAS Operations To Digital Is Consistent With The Commission's DTV Policies	21
C. Conversion Of BAS Operations To Digital Promotes MSS/FS Sharing	23
IV. THE COMMISSION'S DECISION TO IMPOSE RELOCATION COSTS ON MSS OPERATIONS IS UNWARRANTED.....	24
A. The Commission's Decision To Impose Relocation Costs On MSS Operators Was Premature	25

B.	The Commission’s Decision To Impose Relocation Costs On MSS Operators Was Inappropriate Because The Commission Must Resolve Issues Of Harmful Interference From BAS Operations In 1990-2025 MHz Irrespective Of Whether MSS Service Commences In the United States	26
C.	The PCS Relocation Model Is Inappropriate For MSS	28
V.	THE EFFECTIVE DENIAL OF MSS MARKET ACCESS AT 2 GHZ RESTRICTS COMPETITION AND IMPAIRS SATELLITE INTERESTS WORLDWIDE	31
	CONCLUSION.....	35

SUMMARY

In its order allocating 70 MHz of spectrum to Mobile Satellite Services (“MSS”), *Amendment of Section 2.106 of the Commission’s Rules to Allocate Spectrum at 2 GHz For Use by the Mobile Satellite Service*, ET Docket No. 95-18 (“Order”), the Commission properly recognizes that MSS will benefit U.S. consumers by bringing additional competition to the mobile communications industry and providing communications services to underserved areas of the country. Parts of the Commission’s decision, however, will preclude these benefits by imposing enormous unnecessary costs upon MSS licensees, thereby effectively erecting a significant barrier to entry for prospective MSS operators who wish to operate in 2 GHz. Thus, the MSS Coalition seeks reconsideration of the following decisions set forth in the Commission’s Order:

- to provide Broadcast Auxiliary Service (“BAS”) licensees with 105 MHz at 2025-2130 MHz rather than a more spectrally efficient allocation of 85 MHz at 2025-2110 MHz; and
- to require MSS operators to pay incumbent Fixed Service (“FS”) and BAS relocation expenses.

The Commission’s decision to allocate 20 MHz of supplemental spectrum at 2110-2130 MHz to broadcasters for BAS, should be reconsidered for two reasons. First, the decision was based on an incomplete record concerning both the existing and future spectrum needs of BAS licensees. Because the Commission will not obtain this critical information until its Further Notice of Proposed Rulemaking, its decision was based on speculation, and, as such, cannot stand. Second, recent developments advancing the

broadcast industry's conversion to digital technology demonstrate that the Commission vastly overestimated the amount of spectrum required by BAS licensees.

As evidenced by the Commission's recent digital television ("DTV") order, the Commission is working aggressively to accelerate the conversion of the broadcast industry from an analog to a digital environment. The unmistakable message from the Commission's expedited timetable for DTV conversion is that it is no longer a question of whether the broadcast industry will convert to digital, but simply a matter of when. Dramatic advances in digital technology have led to the development of new digital equipment that will support this conversion. Indeed, many media outlets currently employ digital equipment for much or a portion of their operations. In those markets where necessary, this same digital technology and equipment can be used to allow broadcasters to operate in 85 MHz, using a flexible channelization scheme that employs analog, digital or combined analog/digital transmissions. Because the Commission did not take these changed circumstances into account in its 2 GHz Order, its decision with respect to the amount of spectrum required for BAS operations must be reconsidered.

Because the Commission's Order does not consider the actual spectrum needs of BAS operators or the developments in digital technology that might accommodate those needs, the Commission should reconsider its decision to allocate supplemental spectrum at 2110-2130 MHz for BAS operations. In fact, BAS operations can -- and should -- be fully accommodated in the 2025-2110 MHz band. Any other result would run contrary to the Commission's goals of promoting spectrum efficiency and encouraging the broadcast

industry's rapid conversion to digital. In addition, the provision of supplemental spectrum to BAS at 2110-2130 MHz is wholly inconsistent with the Commission's laudable decision to permit FS/MSS sharing in the downlink band at 2165-2200 MHz. Because the incumbent FS licensees at 2110-2130 MHz have a paired link at 2160-2180 MHz, these licensees require a concomitant relocation of that paired link, thereby complicating, and perhaps totally frustrating, consideration of any opportunity for sharing in a large portion of the MSS downlink.

The Commission also should reconsider its decision to require MSS operators to bear the costs of relocating incumbent operators in the spectrum allocated to competitive MSS. Such a decision was at best premature because, as discussed above, BAS licensees can be fully accommodated without the supplemental allocation at 2110-2130 MHz. Moreover, by imposing these substantial costs on MSS operators -- costs that will approach \$1 billion -- the Commission may well prevent rather than encourage the development of MSS. Although the Commission previously imposed relocation costs on PCS providers, the significant differences in the situations faced by PCS providers with respect to incumbent relocation as compared to MSS providers require that these costs not similarly be imposed on MSS providers. Imposition of relocation costs on 2 GHz MSS systems also would unfairly burden those systems in light of the U.S. international commitments following WRC-95 to coordinate and implement transitional arrangements for terrestrial radio systems in the 2 GHz MSS bands, regardless of whether any MSS providers seek to access the U.S. market at 2 GHz.

In addition, the Commission's decision to impose relocation costs on 2 GHz MSS operators will effectively deny market access at 2 GHz to both non-U.S.-licensed and U.S.-licensed MSS systems. By requiring MSS providers that operate in the 2 GHz band, using either U.S. or non-U.S.-licensed space segment, to bear the costs of relocation when a similar burden was not placed on U.S.-licensed global MSS providers operating Big LEO systems in the 1.6/2.4 GHz bands, the Commission unfairly restricts competition in the global MSS market. Such discriminatory treatment contradicts prior U.S. positions on open market access and denies consumers worldwide the benefits of full and fair competition for global MSS.

These Commission decisions seriously call into question the viability of providing MSS in the 2 GHz band in the United States and could reduce the availability of MSS services worldwide. Unless the Commission acts favorably on this petition, U.S. consumers may never enjoy the benefits that international competitive MSS would otherwise bring to the United States.

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Celsat America, Inc. ("Celsat"), COMSAT Corporation ("COMSAT"), Hughes Space and Communications International ("Hughes"), ICO Global Communications ("ICO"), and Personal Communications Satellite Corporation ("PCSAT")¹ (collectively, the "Joint Petitioners" or "MSS Coalition"), by their attorneys submit this petition for partial reconsideration in response to the Federal Communications Commission's ("FCC" or "Commission") March 14, 1997 Order ("Order" or "2 GHz Order") in the above-referenced proceeding.²

¹ PCSAT is a wholly owned subsidiary of American Mobile Satellite Corporation.

² ICO notes that the Commission omits ICO from a list set forth in the Order of satellite companies that have expressed an interest in providing mobile satellite service in the 2 GHz band. *See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service*, FCC 97-93 (rel. Mar. 14, 1997) ("Order" or "2 GHz Order" or "2 GHz FNPRM") at ¶ 13 n.37. ICO fully intends to provide such service in the United States and, for that reason, has previously participated in this proceeding. *See* Letter from Cheryl A. Tritt to William F. Caton regarding ICO Global Communications Declaration of Intent to Provide Global Mobile Satellite Services in the United States (Oct. 18, 1996).

INTRODUCTION

By allocating 70 MHz of spectrum at 2 GHz to Mobile Satellite Services (“MSS”), the Commission’s 2 GHz Order has substantially increased the potential for additional competitive MSS offerings in the United States. As the Commission properly recognized in its Order, MSS not only provides the opportunity for new competitive mobile communications services, it also promises communications to rural and remote underserved areas that are less feasible for coverage by Personal Communications Services (“PCS”), cellular and other mobile services.³

Despite the Commission’s recognition of the great potential of the MSS industry, critical parts of the FCC’s decision seriously undermine the agency’s goal of encouraging the development of MSS in the U.S. Indeed, the result -- however unintended -- of the Commission’s decision will be that *no* MSS operator likely will be able to provide service to U.S. consumers in the 2 GHz band. Such a result is clearly not in the public interest. Accordingly, the MSS Coalition seeks reconsideration of the following two decisions in the Commission’s Order: (1) the decision to provide BAS licensees with more than the 85 MHz of spectrum at 2025-2110 MHz; and (2) the decision to require MSS operators to pay incumbent FS and BAS relocation expenses.

Because of the urgency of this situation, the MSS Coalition requests expedited consideration of its Petition.

³ Order at ¶ 13.

I. THE COMMISSION MUST RECONSIDER THE AMOUNT OF SPECTRUM IT ACCORDED BAS LICENSEES BECAUSE THAT DECISION IS BOTH ARBITRARY AND CAPRICIOUS AND AN ABUSE OF DISCRETION

In its Order, the Commission concludes that “it is necessary to relocate BAS in order to accommodate MSS in the 1990-2025 MHz band.”⁴ Although the Commission asserts that this decision is “[b]ased on the record,”⁵ the record here is devoid of critical information relevant to the issue of whether there is a need to provide BAS with supplemental spectrum at 2110-2130 MHz. The Commission implicitly acknowledges as much in the issues that it postpones to its Further Notice of Proposed Rulemaking (“FNPRM”), where it asks commenters for information regarding the minimum amount of spectrum needed for BAS operations. The Commission asks, for example:

- whether all seven BAS channels are needed in all markets;
- whether BAS licensees would be able to operate with narrower channels by switching to digital equipment; and
- what implications the broadcast industry’s conversion from analog to digital may have for BAS spectrum requirements.⁶

Given that the Commission lacks answers to these questions, its decision to provide BAS licensees with 20 MHz of supplemental spectrum ostensibly to accommodate their move from BAS channels 1 and 2 in the 2 GHz band was based on speculation concerning the minimum amount of spectrum required for BAS operations. Moreover, because the answers to these

⁴ Order at ¶ 30.

⁵ *Id.*

⁶ *Id.* at ¶ 68.

questions directly affect BAS operators' spectrum needs, the Commission must obtain and consider the answers prior to providing BAS operators with supplemental spectrum at 2110-2130 MHz. The Commission's unsupported decision in this regard is all the more egregious because its ultimate effect will be the demise of the very MSS industry that the 2 GHz Order sought to foster.

Because BAS operations are incompatible with MSS satellite uplinks at 2 GHz,⁷ the Commission's decision to allocate 35 MHz in the 1990-2025 MHz band to MSS uplinks precipitated its decision to clear BAS out of the MSS uplink band and provide BAS licensees with an additional 20 MHz of spectrum in the 2110-2130 MHz band.⁸ The Commission's allocation of additional spectrum to BAS seemingly is based upon assumptions that BAS operations will continue indefinitely in an FM analog mode and that they will require at least 15 MHz of spectrum per BAS channel in a total of seven channels nationwide.⁹

In providing supplemental spectrum for BAS at 2110-2130 MHz, however, the Commission lacked key information regarding BAS spectrum use. Before allocating this spectrum, the Commission should have determined, or at least attempted to determine, the

⁷ The basic incompatibility of BAS and MSS services is due to the significant differences in the transmit power of the two services. Comments of COMSAT, May 5, 1995 at 8-10, App. I.

⁸ Order at ¶ 5. Celsat notes, as it has in previous rulemaking proceedings before the Commission, that it can operate in the 1990-2025 MHz and 2165-2200 MHz bands without causing harmful interference either to BAS/ENG facilities or FS facilities. Consequently, where the MSS Coalition's analysis in the Petition concludes that sharing is not possible between non-GEO MSS operators and either BAS/ENG facilities or FS facilities (whether in the uplink or in the downlink at 2 GHz), such analysis and the conclusions flowing therefrom are not applicable to Celsat.

⁹ *Id.* at ¶ 32.

true spectrum needs for continued BAS operations in markets nationwide. Presumably, only after assessing those needs could the Commission accurately decide whether BAS licensees required supplemental spectrum or whether, after channels 1 and 2 were cleared for MSS, BAS could continue to operate in the remaining spectrum at 2025-2110 MHz, using a more efficient modulation scheme. Critical information relevant to the assessment of BAS spectrum needs, however, was not a part of the record on which the Commission based its decision, but instead was postponed to the FNPRM.

For example, the Commission concludes in the Order that BAS operators require a total of 105 MHz for their nationwide operations -- seven channels of 15 MHz each.¹⁰ It does not appear, however, that the record contains information about either the level of current use of the 2 GHz spectrum by BAS operators nationwide or their ability to conduct BAS operations in less bandwidth using more modern transmission equipment. Instead, the Commission apparently relies on the mere assertion of the broadcast industry that BAS demand currently exceeds supply.¹¹ That assertion, however, is based solely on the broadcast industry's survey of 2 GHz spectrum coordinators in the top 25 broadcast markets.¹² The

¹⁰ *Id.*

¹¹ *See id.* at ¶ 17 (noting Association for Maximum Service Television, Inc. ("MSTV") contention that demand for BAS spectrum already exceeds capacity).

¹² *See* Joint Comments of the Association for Maximum Service Television, Inc. and Other Major Television Broadcasting Entities, filed May 5, 1995, at 11 and Exhibit A attached thereto.

broadcasters did not provide -- and the Commission did not obtain or seek to obtain -- information concerning the nearly 200 other broadcast markets.¹³

As to those 200 other markets, there is no evidence in the record that Electronic News Gathering (“ENG”) operations require all seven channels currently dedicated to BAS. Indeed, the Commission acknowledges in the FNPRM the possibility that in some of these markets BAS operations could be accommodated in less spectrum. Specifically, the Commission states that “it is possible that in some markets not all of the seven BAS channels will be needed.”¹⁴ To the extent that the Commission has acknowledged this possibility, it also necessarily has acknowledged that it does not know how many channels BAS operations actually require in the vast majority of markets nationwide.

The record also is incomplete with respect to the minimum amount of spectrum per channel required for BAS operations. Numerous commenters argued that digital compression technology could reduce significantly the amount of spectrum required per channel compared

¹³ Because the broadcasters are uniquely able to provide this information to the Commission, the Commission should require them to provide it. Only individual broadcasters are in a position to know their unique BAS spectrum requirements. Even the Commission cannot extract this information from its own licensing databases, because broadcasters are awarded a single BAS license for all of their BAS operations. The Commission thus should require BAS operators to substantiate their BAS spectrum usage claims, or infer from their silence that 85 MHz is sufficient spectrum to conduct BAS operations in all markets. The Commission cannot award BAS operators supplemental spectrum at 2110-2130 MHz unless and until they offer such evidence.

¹⁴ Order at ¶ 68. The Commission further states that in some markets, BAS licensees “may prefer to adhere to the current BAS channel plan, simply forgoing the use of channels A1 and A2” *Id.* This suggests, of course, that the Commission at least suspects that in some markets, five channels at most are required to accommodate BAS operations.

to that needed for analog FM television transmissions.¹⁵ Nevertheless, the Commission ignores this possibility and simply assumes the continued (and inefficient) use of analog FM technology for BAS operations in all markets for the foreseeable future.¹⁶

At the same time, however, the Commission acknowledges in the FNPRM that “[i]t is also possible that by switching to digital equipment, BAS licensees may be able to operate with narrower channels.”¹⁷ If this is the case -- and the MSS Coalition believes there is now abundant evidence to demonstrate that it is -- there likely is no need to allocate 20 MHz of supplemental spectrum to BAS, as the Commission has done. It is incumbent upon the Commission to determine whether narrower channels are a viable option *before* concluding that BAS licensees require supplemental spectrum, particularly because the prospect of BAS conversion to digital -- at least in the largest markets where spectrum usage is the heaviest -- is directly relevant to an assessment of the spectrum needs of BAS licensees.

By finally deciding the spectrum needs of BAS, without having first compiled a full and complete record assessing digital technology’s present ability to improve BAS spectrum utilization or the actual channel requirements for the majority of BAS markets, the Commission has rendered a decision that is arbitrary and capricious. Moreover, the

¹⁵ See, e.g., Comments of Loral/Qualcomm Partnership, L.P., 15, May 5, 1995; Comments of COMSAT Corporation, 22, May 5, 1995; Comments of TRW, 11, May 5, 1995; Joint Comments of the MSS Coalition, 16-17, May 5, 1995.

¹⁶ Order at ¶ 32.

¹⁷ *Id.* at ¶ 68.

Commission's decision to delay to the further notice consideration of the broadcasters' conversion to digital ENG constitutes an abuse of the Commission's discretion.

As the courts have made abundantly clear, in order to survive judicial review, Commission action must be based upon "reasoned decisionmaking" supported by a complete factual record.¹⁸ Decisions based on faulty data or speculation by the agency as to critical facts cannot stand.¹⁹ Moreover, the Commission cannot postpone consideration of issues that are inextricably intertwined with a decision the Commission has made.²⁰ As the United States Court of Appeals for the District of Columbia Circuit explained, "an agency does not act rationally when it chooses and implements one policy and decides to consider the merits of a potentially inconsistent policy in the very near future."²¹

¹⁸ See *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 52 (1983) ("the agency's explanation . . . is not sufficient to enable us to conclude that the [decision] was the product of reasoned decisionmaking. To reach this conclusion, we . . . appreciate the limitations of this record in supporting the agency's decision."); *Clifton Power Corp. v. FERC*, 88 F.3d 1258, 1265 (1996) (an agency's findings of fact must be based upon substantial evidence and its conclusion of law must be the product of reasoned decisionmaking).

¹⁹ See *Lloyd Noland Hospital and Clinic v. Heckler*, 619 F. Supp. 1, 10 (N.D. Ala. 1984) ("Reliance on faulty data in the promulgation of a rule is also a basis for finding that the rule was issued in an arbitrary manner.") The non-representative data underlying the Commission's BAS decision could, at best, be characterized as faulty. See also *National Gypsum Co. v. U.S. EPA*, 968 F.2d 40, 43-44 (D.C. Cir. 1992) (agency cannot infer facts not in the record); *Natural Resources Defense Council, Inc. v. U.S. EPA* 859 F.2d 156, 210 (D.C. Cir. 1988) (agency actions based upon speculation are arbitrary and capricious).

²⁰ *ITT World Communications, Inc. v. FCC*, 725 F.2d 732, 754 (D.C. Cir. 1984) ("ITT World Communications").

²¹ *Id.* at 754.

As explained above, the Commission here has failed to compile an adequate record regarding the spectrum needs of BAS operations and, as such, has an insufficient evidentiary basis for its decision to provide BAS operators with supplemental spectrum in the 2110-2130 MHz band. The Commission determined to accord BAS operators with supplemental spectrum before deciding the “inextricably intertwined” issues of whether BAS operators: (1) required such supplemental spectrum in all markets; and (2) could convert their ENG operations to digital, where necessary, and concomitantly reduce their spectrum needs. The decision is therefore both arbitrary and capricious and an abuse of discretion and must be reconsidered.²²

II. THE COMMISSION MUST RECONSIDER THE AMOUNT OF SPECTRUM IT ACCORDED BAS LICENSEES IN LIGHT OF RECENT REGULATORY AND TECHNOLOGICAL DEVELOPMENTS REGARDING DIGITAL TECHNOLOGY

Reconsideration of a Commission decision is also warranted where, as here, circumstances have changed since the adoption of a Commission order.²³ Since the Commission released its 2 GHz Order on March 14, 1997, there have been dramatic

²² See *Florida Power & Light Co. v. Lorion*, 470 U.S. 729, 744 (1985) (“If the record before the agency does not support the agency action . . . the proper course, except in rare circumstances, is to remand to the agency for additional investigation or explanation.”).

²³ 47 C.F.R. § 1.429(b)(1). See also *Amendment of Parts 21, 43, 74, 78 and 94 of the Commission’s Rules Governing Use of the Frequencies in the 2.1 and 2.5 GHz Bands Affecting: Private Operational-Fixed Microwave Services, Multipoint Distribution Service, Multichannel Multipoint Distribution Service, Instructional Television Fixed Service & Cable Television Relay Service*, 10 FCC Rcd 7074, 7078 (1995) (changed circumstances including recent technological developments warrant change of Commission rule on petition for reconsideration).

regulatory developments regarding the conversion of broadcast television from analog to digital technology. In addition, there have been dramatic technological developments with respect to the efficacy and commercial availability of spectrally efficient digital television transmission formats in a variety of television distribution systems. As discussed below, these developments “concern directly”²⁴ the Commission’s decision to accord broadcasters with 20 MHz of supplemental spectrum at 2110-2130 MHz. The Commission’s failure to consider these relevant developments constitutes an abuse of discretion.²⁵ Accordingly, these regulatory and technological developments warrant partial reconsideration of the Commission’s 2 GHz Order.

A. The Commission’s DTV Order Has Accelerated The Conversion Of Over-The-Air Broadcast Television Operations From Analog To Digital

On April 3, 1997, less than three weeks after the Commission released its 2 GHz Order, the Commission adopted rules that will govern digital television (“DTV”).²⁶ Acknowledging that “[b]roadcasters have long recognized that they must make the switch to

²⁴ *ITT World Communications*, 725 F.2d at 754.

²⁵ *Id.* at 754-55 (FCC abused its discretion by implementing one policy prior to considering issues which “concern directly” that policy).

²⁶ After much public debate, the DTV Order assigned each eligible broadcaster a 6 MHz channel, at no cost, for DTV use. *Advanced Television Systems and Their Impact upon the Existing Broadcast Service*, FCC 97-116 (Apr. 21, 1997) at ¶ 12 (“DTV Order”). Not only were broadcasters given this additional channel for use during the transition to DTV, the Commission also adopted flexible rules that will allow broadcasters to provide ancillary and supplemental services (including income generating services) on their DTV channel so long as they broadcast a single over-the-air digital service. *Id.* at ¶ 29.

digital technology,”²⁷ the Commission in the DTV Order adopted rules that would “encourage broadcasters to offer digital television *as soon as possible*.”²⁸ As the Commission recognized, the need for broadcasters to convert rapidly to digital technology is hastened by the competitive pressures of other media outlets that use or plan to use digital technology, including direct broadcast services, cable and wireless cable.²⁹

In what Chairman Hundt termed a “radical departure” from prior Commission decisions,³⁰ the Commission announced its commitment to convert the broadcast industry from an analog to a digital environment on a rapid timetable. Specifically, the Commission imposed the following DTV buildout requirements on broadcasters:

- | | |
|-------------------|--|
| May 1, 1999: | Affiliates of the top four networks in the top 10 markets must carry a digital signal. |
| November 1, 1999: | Affiliates of the top four networks in markets 11-30 must carry a digital signal. |
| May 1, 2002: | All other commercial broadcasters must carry a digital signal. |
| May 1, 2003: | All noncommercial broadcasters must carry a digital signal. ³¹ |

²⁷ *Id.* at ¶ 3.

²⁸ *Id.* at ¶ 5 (emphasis supplied). As the Commission noted in its DTV Order, “[o]ne of [its] overarching goals in [the DTV] proceeding is the rapid establishment of successful digital broadcast services that will attract viewers from analog to DTV technology.” *Id.* at ¶ 97. The Commission also remarked that programming flexibility in a DTV environment “will increase incentives to proceed faster with the transition.” *Id.* at ¶ 42.

²⁹ *Id.* at ¶ 80.

³⁰ *Id.*, Separate Statement of Chairman Reed E. Hundt at 1.

³¹ *Id.* at ¶ 76.

In addition, the National Association of Broadcasters (“NAB”) has committed to an even earlier conversion by some stations. Specifically, NAB has committed to have certain network owned and operated stations in the top 10 markets (serving 30 percent of American households) begin transmitting digital signals within 18 months, *i.e.*, by November 1, 1999.³²

The Commission has targeted the transition period to end in 2006.³³ At that time, analog service will cease and all broadcasters who have not received extensions will be required to return one of their two 6 MHz channels.³⁴ The issue is, thus, not whether television broadcasting will “go digital,” but when.³⁵ As discussed below, because the Commission’s DTV policies likely will impact the future of BAS operations, the Commission’s refusal to consider them in its 2 GHz decision³⁶ constitutes an abuse of discretion.³⁷

³² *Id.* at ¶ 85. Initially, the Commission had proposed a 15-year transition period for all broadcasters. *Id.* at ¶ 99.

³³ *Id.* at ¶ 99.

³⁴ *Id.* at ¶ 100.

³⁵ Seven experimental DTV television stations have recently gone on the air. *See* Steven McClellan, Glen Dickson, Liz Rathburn, *DTV for Pain and Profit*, Broadcasting & Cable, April 14, 1997 at 4. Three more experimental licenses have been granted and an additional five likely will be granted shortly. DTV Order at ¶ 90. Other countries are adopting digital technology on an expedited schedule as well. The United Kingdom, for example, expects to begin over-the-air digital television broadcasting by 1998 or even earlier. *Id.* at ¶ 81. Japan also recently announced that it will convert from analog high definition television to digital television. *Id.*

³⁶ Order at ¶ 32 (“[W]e do not believe that this is the appropriate proceeding to determine whether or when BAS should convert to digital format in conjunction with the development of digital television.”).

³⁷ *ITT World Communications*, 725 F.2d at 754-55.

B. Digital Technology Is Currently Used In A Variety Of Applications

By accelerating the timetable for DTV transition, the Commission's DTV Order implicitly recognizes the existence and prevalence of digital technology for compression and transmission of digital television signals. As discussed more fully in the White Paper prepared jointly by COMSAT and Hughes (attached to this Petition as Exhibit A³⁸), in the last two years advances in technology have made available digital equipment that can transmit a contribution quality signal in channels of 12 MHz or less, as compared to 17 MHz now used for analog FM transmission, or 15 MHz adopted in the 2 GHz Order.

The efficacy of digital compression and transmission technology has been proven in satellite news gathering ("SNG") operations employed by broadcasters. Conventionally, broadcasters have used analog FM technology to transmit single television channels for their SNG operations, similar to current ENG operations. Broadcasters have recently adopted digital technology to convert parts of their SNG operations for digital transmission over satellite to lower space segment costs by reducing required satellite transmission bandwidth. Analog FM transmission of a single television channel over a Ku-band satellite requires an entire 27 MHz transponder. By converting to digital transmission, broadcast SNG operators have reduced to 6 to 8 MHz the satellite bandwidth required to transmit a single contribution-quality television signal. Accordingly, with digital technology, the same 27 MHz (Ku-band) transponder can be used to transmit as many as four television signals, as compared to one

³⁸ Diana U. Choi and Jeffrey B. Binckes, 2 GHz Broadcast Auxiliary Services (Electronic News Gathering), Increased Spectrum Efficiency Through Digital Video Compression and Transmission (May 16, 1997) ("Exhibit A").

television signal with analog FM technology.³⁹ ENG transmissions would require similar, if not identical, bandwidths as SNG to provide the same contribution quality signal that is demanded by both SNG and ENG applications. Identical digital (codec and modem) equipment used for SNG transmissions can also be used for ENG transmissions without any modifications to the digital equipment commercially available today.⁴⁰

The prevalent use of digital compression technology can be seen in a variety of other video applications as well. For example, direct-to-home satellite providers, such as DIRECTV, Echostar, Primestar, and Alphastar use digital compression equipment supplied by General Instruments, Divicom, and TVComm, to provide high quality digital television signals via satellite to consumers. Cable operators, such as TCI, are also beginning to adopt digital technology for digital television transmission to home consumers. In addition, cable programmers, such as HBO, use digital equipment to reduce transmission costs for its satellite and cable backhaul traffic to cable headends.

³⁹ Exhibit A at 5.

⁴⁰ For example, Wegener Communications (using technology developed by COMSAT Laboratories), commercially markets and sells a digital audio/video encoder and integrated receiver decoder, known as the DV2000 Series MPEG-2 Digital Video Transmission System, that is capable of delivering high-quality video compression for SNG and general program distribution applications. This equipment can provide contribution quality signals in transmission bandwidths of less than 12 MHz. In addition, this equipment is compact and rugged enough for SNG/ENG truck applications. CNN is using this equipment for its SNG transmissions. After extensive joint evaluations undertaken with NBC, Ascent Network Services selected this Wegener equipment to provide backhaul feeds for the MSNBC network. CBS uses Tiernan equipment for its digital SNG operations. *Id.* at 7.

C. Existing Digital Technology Can Be Applied To ENG Use

Concerns regarding the feasibility of digital compression technology for ENG operations raised by commenters in this proceeding only two years ago⁴¹ have been substantially mitigated. As discussed above, recent technological developments demonstrate that digital video compression can provide a contribution quality signal in nominal bandwidths of 6 to 12 MHz -- well below the 15 MHz per channel allocated to BAS in the 2 GHz Order. Coupled with digital transmission technology, *i.e.*, digital modulation and error correction techniques, a digital video signal can be far more robust⁴² than an analog signal transmitted using analog frequency modulation.

The growing adoption of digital video compression for numerous applications, as discussed above, has led to wide production of digital equipment that can deliver high-quality digital compressed video. Significant improvements have been made in the last few years since the instant proceeding was initiated. Contrary to the earlier claims of broadcasters, numerous digital video equipments are, indeed, commercially available today that can suit ENG application needs. In addition to improved MPEG-2 4:2:0 codecs, numerous companies now also provide MPEG-2 4:2:2 compression equipment that were not available a couple

⁴¹ See, *e.g.*, SBE Comments at 5-6.

⁴² Applying digital modulation and forward error correction coding can provide a very robust digital signal because a high constant audio-video quality can be maintained during transmission in noisy environments. Relative to analog transmission at a given carrier-to-noise ratio, digital transmission also has the advantage of being able to transmit over longer distances. A high constant picture quality can be sustained even at reduced receive (digital) signal levels, while with analog transmission, the picture quality (signal-to-noise ratio) degrades on a dB-for-dB basis with decreasing receive signal level. See Exhibit A at 8-9.

years ago. In fact, numerous companies were displaying their latest compression equipment, including MPEG-2 4:2:2 codecs, at the recent NAB convention in Las Vegas.

In addition, the INTELSAT interoperability tests have also facilitated the application of digital video compression.⁴³ These tests have significantly helped news agencies solve technical difficulties to ensure interoperability of different manufacturer's digital equipment for satellite transmission (SNG). As discussed above, "off-the-shelf" digital codec and modem equipment currently used for SNG transmissions can also be used for ENG transmissions without any modifications to the digital equipment.

The Commission and broadcast industry have the capability to adopt a more spectrum efficient and dynamic broadcast channelization plan that is flexible to accommodate anywhere from five all-analog channels to 14 all-digital channels, or a combination of both digital and analog channels, for ENG use in the 85 MHz of BAS spectrum at 2025-2110 MHz. The flexibility of accommodating multiple rechannelization plans results from the configurability of digital codec and modem equipment to program variable data rates and code rates for different content material and transmission environments. This rechannelization flexibility is clearly not possible solely using analog technology.⁴⁴

In anticipation of the overall conversion to digital, the broadcast industry already has begun to replace some of its analog ENG equipment with new digital equipment. It has been reported, for example, that Sinclair Communications, Inc.'s station in Pittsburgh,

⁴³ *Id.* at 10.

⁴⁴ *See id.* at 13.

Pennsylvania, WPGH-TV, will complete its conversion to an “all-digital” news operation in August of 1997.⁴⁵ Likewise, the 13 CBS owned and operated stations in major markets across the country have replaced some of their analog ENG field equipment with digital equipment.⁴⁶ Benedek Broadcasting, which owns 22 stations in small and mid-sized markets, is also upgrading some of its existing analog ENG equipment with digital equipment at 10 of its stations.⁴⁷ Although these broadcasters are not currently transmitting digitally in their ENG links, these examples nonetheless demonstrate that broadcasters are positioning themselves for the imminent conversion to digital, with respect to both their broadcast operations generally and some of their ENG operations specifically.

As the Commission recognized in the context of its DTV Order, “[t]he dynamic and flexible nature of digital technology creates the possibility of new and creative ways for broadcasters to serve the country and the public interest.”⁴⁸ This recognition is no less apt in the context of BAS operations in the 2 GHz band. In light of these dramatic new developments as well as the advances in digital technology that are certain to follow, the

⁴⁵ Harry A. Jessell, *Digital domain in Pittsburgh*, Broadcasting & Cable, April 9, 1997 at 28. Cable channels are also making the conversion to digital. In March 1997, The Weather Channel completed the upgrade of its facility to an all-digital system as well. Glen Dickson, *Powering up for DTV*, Broadcasting & Cable, Apr. 9, 1997 at 34.

⁴⁶ Glen Dickson, *CBS makes \$24 million DVCPRO buy*, Broadcasting & Cable, Apr. 7, 1997 at 102.

⁴⁷ Glen Dickson, *Benedek taps DVCPRO*, Broadcasting & Cable, Apr. 7, 1997 at 102. Likewise, independent station WFMZ-TV in Allentown, Pennsylvania, recently purchased digital ENG equipment for its news gathering operations. Glen Dickson, *Cutting Edge*, Broadcasting & Cable, May 5, 1997 at 70.

⁴⁸ DTV Order at ¶ 49.